reads the samples from addresses of the same memory region to thereby create the delay. The delay step responds when the hardware processor is reset so that said one musical tone is switched to another musical tone for successively writing the samples of the waveform of said another musical tone into addresses of the other memory region and successively reading the samples from addresses of the same memory region to thereby create the delay while clearing the one memory region to prepare for a further musical tone.

Described so far is the software sound source that practices the second preferred embodiment of the invention on a personal computer. In the computer system, this sound source software can be handled as either application software or device drive software, for example. The way by which the sound source software is to be handled may be appropriately determined according to the system configuration or the operation system OS used.

The sound source software or the capabilities thereof may be incorporated in another software program such as amusement software, karaoke software, or automatic play and accompaniment software. Also this software may be directly incorporated in the operation system OS. The software according to the present invention can be supplied in a machine-readable disk media such as a floppy disk, a magneto-optical disk, and a CD-ROM or a memory card. Further, the software may be added by means of a semiconductor memory chip (typically ROM) which is inserted in a computer unit. Alternatively, the sound source software associated with the present invention may be distributed through the network I/F 11.

The above description has been made by using the application on a personal computer for example. Application to amusement equipment such as game and karaoke, electronic equipment, and general-purpose electrical equipment is also practical. In addition, application to a sound source board and a sound source unit is practical. Moreover, application to a sound source machine based on software processing using dedicated MPU (DS) is practical. In this case, if the processing capacity of the MPU is high, the sampling frequency can be raised, thereby multiplying the sampling frequency by n when high-precision waveform output is required. Further, when a plurality of sound channels are used on the sound source, variable control on the sampling frequency and skip control on the computation portion that can be skipped in the computation algorithm may be performed according to the number of channels being sounded. In this case, different sampling frequencies may be set to different performance parts or MIDI channels. Still further, in the above-mentioned embodiment, the sampling frequency of the CODEC is fixed. It will be apparent that this sampling frequency is variable. The sampling frequency is made variable by inserting the processing circuit for matching the sampling frequencies between the waveform output buffer WAVEBUF and the CODEC (DAC) by typically oversampling, downsampling, or data interpolation.

The present invention is applicable to a software sound source in which the CPU operates in synchronization with the sampling frequency to periodically execute the software module for successively computing waveform samples. For example, the CPU conducts an interrupt for computing one sample at a period of $1/(n \times f_s)$ where n denotes a number of tones and f_s denotes a sampling frequency. Further, the invention is applicable to a hardware sound source using an LSI chip in order to reduce load of ALU and in order to use resources of LSI chip for other tasks than tone generation.

As described and according to the present invention, music tone waveform generating blocks indicated by a preset algorithm are assigned to selected sound channels, the assigned music tone waveform generating blocks are combined by the algorithm, and music tone waveform generating computation is performed to generate music tone waveform data. Consequently, the number of music waveform generating blocks for the sound channels may be arbitrarily changed before sounding assignment is made. This novel constitution allows, according to the capacity of a music waveform data generating means, flexible adjustment of the load state of the music waveform data generating means and the quality of the music waveform data to be generated.

The music tone waveform generating blocks indicated by an algorithm set according to the timbre of the music tone are assigned to the selected sound channels. The assigned music tone waveform generating blocks are combined by the algorithm to perform music tone waveform generating computation so as to generate the music tone waveform data.

Preferably, in setting timbres by a timbre setting means, if the number of music tone waveform generating blocks is set to a performance part concerned by a means for setting number of blocks, the timbre set to that performance part is changed to a timbre defined by music tone waveform generating blocks within that number of blocks. This novel constitution further enhances the above-mentioned effect.

Preferably, during the music tone waveform generating computation in the sound channel, the number of music tone waveform generating blocks assigned to that sound channel is changed according to a predetermined condition. Consequently, during sounding, the load state of the music tone waveform data generating means and the quality of the music waveform data to be generated may be changed flexibly according to the capacity of that music tone waveform generating means.

Further, according to the present invention, in a computer equipment which often executes a plurality of tasks such as word processing and network communication in addition to music performance, occurrence of troubles such as an interrupted music tone can be reduced when the CPU power is allocated to the tasks not associated with music performance during processing of the software sound source. In other words, more tasks can be undertaken during the execution of sound source processing.

Since the present invention is constituted as described above, when the CPU load is high, the sampling frequency can be lowered, thereby generating tone waveform data that prevents the interruption of a music tone. When the CPU load is low, a higher sampling frequency than the normal sampling frequency can be used, thereby generating high-precision tone waveform data. In this case, the number of sound channels may be changed instead of changing the sampling frequency.

If a particular condition is satisfied, corresponding computational operations are skipped, so that efficient computation can be performed, thereby preventing the CPU load from getting extremely high. Consequently, the tone waveform data can be generated that prevents the sounding of a music tone from being interrupted. Further, the efficient computation allows the use of the higher sampling frequency than the conventional sampling frequency, resulting in high-precision tone waveform data.

While the preferred embodiments of the present invention have been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the appended claims.

What is claimed is:

A. A sound source apparatus having operation blocks composed of softwares used to compute waveforms for

generating a plurality of musical tones through a plurality of channels according to performance information, the apparatus comprising:

a setting device for setting an algorithm which determines a system composed of selective ones of the operation blocks systematically combined with each other to compute a waveform specific to one of the musical tones;

a designating device responsive to the performance information for designating one of the channels to be used for generating said one musical tone; and

a generating device for allocating the selective operation blocks to said one channel and for systematically executing the allocated selective operation blocks according to the algorithm so as to compute the waveform to thereby generate said one musical tone through said one channel.

2. A sound source apparatus according to claim 1, wherein the setting device sets different algorithms which determine different systems corresponding to different timbres of the musical tones, each of the different systems being composed of selective ones of the operation blocks which are selectively and sequentially combined with each other to compute a waveform which is specific to a corresponding one of the different timbres.

3. A sound source apparatus according to claim 2, wherein the setting device comprises a determining device that determines a first system combining a great number of operation blocks and corresponding to a regular timbre and that determines a second system combining a small number of operation blocks and corresponding to a substitute timbre, and a changing device operative when a number of operation blocks executable in the channel is limited under said great number and over said small number due to a load of the computation of the waveform for changing the musical tone from the regular timbre to the substitute timbre so that the second system is adopted for the channel in place of the first system.

4. A sound source apparatus according to claim 1, wherein the setting device comprises an adjusting device operative dependently on a condition during the course of generating the musical tone for adjusting a number of the operation blocks to be allocated to the channel.

5. A sound source apparatus according to claim 4, wherein the adjusting device comprises a modifying device that modifies the algorithm to eliminate a predetermined one or more of the operation blocks involved in the system so as to reduce a number of the operation blocks to be loaded into the channel for adjustment to the condition.

6. A sound source apparatus according to claim 4, wherein the adjusting device operates when the condition indicates that an amplitude envelope of the waveform attenuates below a predetermined threshold level for compacting the system so as to reduce the number of the operation blocks.

7. A sound source apparatus according to claim 4, wherein the adjusting device operates when the condition indicates that an output volume of the musical tone is tuned below a predetermined threshold level for compacting the system so as to reduce the number of the operation blocks.

8. A sound source apparatus according to claim 4, wherein the adjusting device operates when the condition indicates that at least one of the operation blocks declines to become inactive in the system without substantially affecting other operation blocks of the system for eliminating said at least one operation block so as to reduce the number of the operation blocks to be allocated to the channel.

9. A sound source apparatus according to claim 1, wherein the generating device comprises a computing device responsive to a variable sampling frequency for executing the operation blocks to successively compute samples of the waveform in synchronization to the variable sampling frequency so as to generate the musical tone, and a controlling device that sets the variable sampling frequency according to process of computation of the waveform by the operation blocks.

10. A sound source apparatus according to claim 1, wherein the generating device comprises a computing device responsive to a variable sampling frequency for executing the operation blocks to successively compute samples of the waveform in synchronization to the variable sampling frequency so as to generate the musical tone, and a controlling device for adjusting the variable sampling frequency dependently on a load of computation of the waveform during the course of generating the musical tone.

11. A sound source apparatus according to claim 1, wherein the generating device comprises a computing device responsive to a variable sampling frequency for executing the operation blocks to successively compute samples of the waveform in synchronization to the variable sampling frequency so as to generate the musical tone, and a controlling device for adjusting the variable sampling frequency according to result of computation of the samples during the course of generating the musical tone.

12. A sound source apparatus according to claim 1, wherein the generating device comprises a computing device responsive to a variable sampling frequency for executing the operation blocks to successively compute samples of the waveform in synchronization to the variable sampling frequency so as to generate the musical tone, and a controlling device for adjusting the variable sampling frequency dependently on a load of computation during the course of generating the musical tone.

13. A sound source apparatus having a software module used to compute samples of a waveform in response to a sampling frequency for generating a musical tone according to performance information, the apparatus comprising:

a processor device that periodically executes the software module for successively computing samples of the waveform corresponding to a variable sampling frequency so as to generate the musical tone;

a detector device for detecting a load of computation imposed on the processor device during the course of generating the musical tone; and

a controller device operative according to the detected load for changing the variable sampling frequency to adjust a rate of computation of the samples.

14. A sound source apparatus according to claim 13, wherein the controller device provides a fast sampling frequency when the detected load is relatively light, and provides a slow sampling frequency when the detected load is relatively heavy such that the rate of the computation of the samples is reduced by 1/n where n denotes an integer number.

15. A sound source apparatus according to claim 14, wherein the processor device includes a delay device having a memory for imparting a delay to the waveform to determine a pitch of the musical tone according to the performance information, the delay device generating a write pointer for successively writing the samples into addresses of the memory and a read pointer for successively reading the samples from addresses of the memory to thereby create the delay corresponding to an address gap between the write pointer and the read pointer, the delay device being responsive to the fast sampling frequency to increment both of the write pointer and the read pointer by one address for one

sample, otherwise the delay device being responsive to the slow sampling frequency to increment the write pointer by one address n times for one sample and to increment the read pointer by n addresses for one sample.

16. A sound source apparatus according to claim 14, wherein the processor device includes a delay device having a pair of memory regions for imparting a delay to the waveform to determine a pitch of the musical tone according to the performance information, the delay device successively writing the samples of the waveform of one musical tone into addresses of one of the memory regions and successively reading the samples from addresses of the same memory region to thereby create the delay, the delay device being operative when said one musical tone is switched to another musical tone for successively writing the samples of the waveform of said another musical tone into addresses of the other memory region and successively reading the samples from addresses of the same memory region to thereby create the delay while clearing the one memory region to prepare for a further musical tone.

17. A sound source apparatus according to claim 13, wherein the processor device executes the software module composed of a plurality sub-modules for successively computing the waveform, the processor device being operative when one of the sub-modules declines to become inactive without substantially affecting other sub-modules during computation of the waveform for skipping execution of said one sub-module.

18. A sound source apparatus according to claim 14, wherein the processor device includes a delay device having a memory for imparting a delay to the waveform to determine a pitch of the musical tone according to the performance information, the delay device generating a write pointer for successively writing the samples into addresses of the memory and a read pointer for successively reading the samples from addresses of the memory to thereby create the delay corresponding to an address gap between the write pointer and the read pointer, the delay device being responsive to the fast sampling frequency to increment both of the write pointer and the read pointer by one address for one sample, otherwise the delay device being responsive to the slow sampling frequency to increment the write pointer by one address n times for one sample.

19. A sound source apparatus according to claim 14, wherein the processor device includes a delay device for imparting a delay to the waveform to determine a pitch of the musical tone according to the performance information, the delay device successively writing the samples of the waveform of one musical tone into addresses of one memory region of the delay device and successively reading the samples from addresses of said one memory region to thereby create the delay, the delay device being operative when said one musical tone is switched to another musical tone for successively writing the samples of the waveform of said another musical tone into addresses of another memory region of the delay device and successively reading the samples from addresses of said another memory region to thereby create the delay while clearing said one memory region to prepare for a further musical tone.

20. A sound source apparatus having a software module used to compute samples of a waveform for generating a musical tone, the apparatus comprising:

a provider device for variably providing a trigger signal at a relatively slow rate to define a frame period between successive trigger signals, and for periodically providing a sampling signal at a relatively fast rate such that a plurality of sampling signals occur within one frame period;

a processor device resettable in response to each trigger signal and operable to periodically execute the software module for successively computing a number of samples of the waveform corresponding to the sampling signals within one frame;

a detector device for detecting a load of computation imposed on the processor device during the course of generating the musical tone;

a controller device operative according to the detected load for varying the frame period to adjust the number of the samples computed within one frame period, and

a converter device responsive to each sampling signal for converting each of the samples into a corresponding analog signal to thereby generate the musical tones.

21. A sound source apparatus having submodules composed of softwares used to compute waveforms for generating a plurality of musical tones through a plurality of channels according to performance information, the apparatus comprising:

setting means for setting an algorithm which determines a module composed of selective ones of the submodules logically connected to each other to compute a waveform specific to one of the musical tones;

designating means responsive to the performance information for designating one of the channels to be used for generating said one musical tone; and

generating means for loading the selective submodules into said one channel and for logically executing the allocated selective submodules according to the algorithm so as to compute the waveform to thereby generate said one musical tone through said one channel.

22. A sound source apparatus according to claim 21, wherein the setting means sets different algorithms which determine different modules corresponding to different timbres of the musical tones, each of the different modules being composed of selective ones of the submodules which are selectively and sequentially connected to each other to compute a waveform which is specific to a corresponding one of the different timbres.

23. A sound source apparatus according to claim 21, wherein the setting means comprises adjusting means operative dependently on a condition during the course of generating the musical tone for adjusting a number of the submodules to be loaded into the channel.

24. A sound source apparatus according to claim 21, wherein the adjusting means operates when the condition indicates that an amplitude envelope of the waveform attenuates below a predetermined threshold level for compacting the module so as to reduce the number of the submodules.

25. A sound source apparatus according to claim 21, wherein the adjusting means operates when the condition indicates that an output volume of the musical tone is tuned below a predetermined threshold level for compacting the module so as to reduce the number of the submodules.

26. A sound source apparatus according to claim 21, wherein the adjusting means operates when the condition indicates that one of the submodules loses contribution to computation of the waveform without substantially affecting other submodules for eliminating said one submodule so as to reduce the number of the submodules to be loaded into the channel.

27. A sound source apparatus having a software module used to compute samples of a waveform in response to a sampling frequency for generating a musical tone according to performance information, the apparatus comprising:

processor means to periodically execute the software module for successively computing samples of the waveform corresponding to a variable sampling frequency so as to generate the musical tone;

detector means for detecting a load of computation imposed on the processor means during the course of generating the musical tone; and

controller means operative according to the detected load for changing the variable sampling frequency to adjust a rate of computation of the samples.

28. A sound source apparatus according to claim **27**, wherein the controller means provides a fast sampling frequency when the detected load is relatively light, and provides a slow sampling frequency when the detected load is relatively heavy such that the rate of the computation of the samples is reduced by 1/n where n denotes an integer number.

29. A sound source apparatus according to claim **28**, wherein the processor means includes delay means having a memory for imparting a delay to the waveform to determine a pitch of the musical tone according to the performance information, the delay means generating a write pointer for successively writing the samples into addresses of the memory and a read pointer for successively reading the samples from addresses of the memory to thereby create the delay corresponding to an address interval between the write pointer and the read pointer, the delay means being responsive to the fast sampling frequency to increment both of the write pointer and the read pointer by every one address for every one sample, otherwise the delay means being responsive to the slow sampling frequency to increment the write pointer by every one address at n times for repeatedly writing one sample into consecutive n addresses.

30. A sound source apparatus according to claim **28**, wherein the processor means includes delay means having a memory for imparting a delay to the waveform to determine a pitch of the musical tone according to the performance information, the delay means generating a write pointer for successively writing the samples into addresses of the memory and a read pointer for successively reading the samples from addresses of the memory to thereby create the delay corresponding to an address interval between the write pointer and the read pointer, the delay means being responsive to the fast sampling frequency to increment both of the write pointer and the read pointer by every one address for every one sample, otherwise the delay means being responsive to the slow sampling frequency to increment the write pointer by every one address at n times for repeatedly writing one sample into consecutive n addresses and to skip the read pointer by consecutive n addresses for reading one sample.

31. A sound source apparatus having a software module used to compute samples of a waveform for generating a musical tone, the apparatus comprising:

provider means for variably providing a trigger signal at a relatively slow rate to define a frame period between successive trigger signals, and for periodically providing a sampling signal at a relatively fast rate such that a plurality of sampling signals occur within one frame period;

processor means resettable in response to each trigger signal and operable based on each sampling signal to periodically execute the software module for successively computing a number of samples of the waveform within one frame period;

detector means for detecting a load of computation imposed on the processor means during the course of generating the musical tone;

controller means operative according to the detected load for varying the frame period to adjust the number of the samples computed within one frame period, and

converter means responsive to each sampling signal for converting each of the samples into a corresponding analog signal to thereby generate the musical tones.

32. A sound source apparatus having a software module used to compute samples of a waveform for generating a musical tone, the apparatus comprising:

provider means for periodically providing a trigger signal at a relatively slow rate to define a frame period between successive trigger signals, and for periodically providing a sampling signal at a relatively fast rate such that a plurality of sampling signals occur within one frame period;

processor means resettable in response to a trigger signal and operable in response to each sampling signal to periodically execute the software module for successively computing a number of samples of the waveform within one frame period; and

converter means responsive to each sampling signal for converting each of the samples into a corresponding analog signal to thereby generate the musical tones, wherein

the processor means includes delay means having a pair of memory regions for imparting a delay to the waveform to determine a pitch of the musical tone according to the performance information, the delay means successively writing the samples of the waveform of one musical tone into addresses of one of the memory regions and successively reading the samples from addresses of the same memory region to thereby create the delay, the delay means being operative when the processor means is reset so that said one musical tone is switched to another musical tone for successively writing the samples of the waveform of said another musical tone into addresses of the other memory region and successively reading the samples from addresses of the same memory region to thereby create the delay while clearing the one memory region to prepare for a further musical tone.

33. A method using submodules composed of softwares to compute waveforms for generating a plurality of musical tones through a plurality of channels according to performance information, the method comprising the steps of:

setting an algorithm which determines a module composed of selective ones of the submodules logically connected to each other to compute a waveform specific to one of the musical tones;

designating one of the channels to be used for generating said one musical tone in response to the performance information;

loading the selective submodules into said one channel; and

logically executing the loaded selective submodules according to the algorithm so as to compute the waveform to thereby generate said one musical tone through said one channel.

34. A method according to claim **33**, wherein the step of setting sets different algorithms which determine different modules corresponding to different timbres of the musical tones, each of the different modules being composed of selective ones of the submodules which are selectively and sequentially connected to each other to compute a waveform which is specific to a corresponding one of the different timbres.

35. A method according to claim 33, wherein the step of setting comprises adjusting a number of the submodules to be loaded into the channel dependently on a condition during the course of generating the musical tone.

36 A method according to claim 35, wherein the step of adjusting comprises compacting the module so as to reduce the number of the submodules when the condition indicates that an amplitude envelope of the waveform attenuates below a predetermined threshold level.

37. A method according to claim 35, wherein the step of adjusting comprises compacting the module so as to reduce the number of the submodules when the condition indicates that an output volume of the musical tone is tuned below a predetermined threshold level.

38. A method according to claim 35, wherein the step of adjusting comprises eliminating at least one submodule so as to reduce the number of the submodules to be loaded into the channel when the condition indicates that said at least one submodule loses contribution to computation of the waveform without substantially affecting other submodules.

39. A method using a hardware processor and a software module to compute samples of a waveform in response to a sampling frequency for generating a musical tone according to performance information, the method comprising the steps of:

periodically operating the hardware processor to execute the software module for successively computing samples of the waveform corresponding to a variable sampling frequency so as to generate the musical tone;

detecting a load of computation imposed on the hardware processor during the course of generating the musical tone; and

changing the variable sampling frequency according to the detected load to adjust a rate of computation of the samples.

40. A method according to claim 39, wherein the step of changing provides a fast sampling frequency when the detected load is relatively light, and provides a slow sampling frequency when the detected load is relatively heavy.

41. A method using a hardware processor having a software module used to compute samples of a waveform for generating a musical tone, the method comprising the steps of:

variably providing a trigger signal at a relatively slow rate to define a frame period between successive trigger signals;

periodically providing a sampling signal at a relatively fast rate such that a plurality of sampling signals occur within one frame period;

operating the hardware processor resettable in response to each trigger signal and operable based on each sampling signal to periodically execute the software module for successively computing a number of samples of the waveform within one frame period;

detecting a load of computation imposed on the software processor during the course of generating the musical tone;

varying the frame period according to the detected load to adjust the number of the samples computed within one frame period, and

converting each of the samples into a corresponding analog signal in response to each sampling signal to thereby generate the musical tones.

42. A method using a hardware processor having a software module used to compute samples of a waveform for generating a musical tone, the method comprising the steps of:

periodically providing a trigger signal at a relatively slow rate to define a frame period between successive trigger signals;

periodically providing a sampling signal at a relatively fast rate such that a plurality of sampling signals occur within one frame period;

operating the hardware processor resettable in response to a trigger signal and operable based on each sampling signal to periodically execute the software module for successively computing a number of samples of the waveform within one frame period; and

converting each of the samples into a corresponding analog signal in response to each sampling signal to thereby generate the musical tones, wherein

the step of operating includes delay step using a pair of memory regions for imparting a delay to the waveform to determine a pitch of the musical tone according to the performance information, the delay step successively writing the samples of the waveform of one musical tone into addresses of one of the memory regions and successively reading the samples from addresses of the same memory region to thereby create the delay, the delay step responding when the hardware processor is reset so that said one musical tone is switched to another musical tone for successively writing the samples of the waveform of said another musical tone into addresses of the other memory region and successively reading the samples from addresses of the same memory region to thereby create the delay while clearing the one memory region to prepare for a further musical tone.

43. A machine readable media for use in a processor machine including a CPU, said media containing program instructions executable by said CPU for causing the processor machine having submodules composed of softwares to compute waveforms for performing operation of generating a plurality of musical tones through a plurality of channels according to performance information, wherein the operation comprises the steps of:

setting an algorithm which determines a module composed of selective ones of the submodules logically connected to each other to compute a waveform specific to one of the musical tones;

designating one of the channels to be used for generating said one musical tone in response to the performance information;

loading the selective submodules into said one channel; and

logically executing the loaded selective submodules according to the algorithm so as to compute the waveform to thereby generate said one musical tone through said one channel.

44. A machine readable media according to claim 43, wherein the step of setting sets different algorithms which determine different modules corresponding to different timbres of the musical tones, each of the different modules being composed of selective ones of the submodules which are selectively and sequentially connected to each other to compute a waveform which is specific to a corresponding one of the different timbres.

45. A machine readable media according to claim 43, wherein the step of setting comprises adjusting a number of the submodules to be loaded into the channel dependently on a condition during the course of generating the musical tone.

46. A machine readable media according to claim 45, wherein the step of adjusting comprises compacting the

module so as to reduce the number of the submodules when the condition indicates that an amplitude envelope of the waveform attenuates below a predetermined threshold level.

47. A machine readable media according to claim 45, wherein the step of adjusting comprises compacting the module so as to reduce the number of the submodules when the condition indicates that an output volume of the musical tone is tuned below a predetermined threshold level.

48. A machine readable media according to claim 45, wherein the step of adjusting comprises eliminating at least one submodule so as to reduce the number of the submodules to be loaded into the channel when the condition indicates that said at least one submodule loses contribution to computation of the waveform without substantially affecting other submodules.

49. A machine readable media for use in a processor machine including a CPU, said media containing program instructions executable by said CPU for causing the processor machine having a software module to compute samples of a waveform in response to a sampling frequency for performing operation of generating a musical tone according to performance information, wherein the operation comprises the steps of:

periodically operating the processor machine to execute the software module for successively computing samples of the waveform corresponding to a variable sampling frequency so as to generate the musical tone;

detecting a load of computation imposed on the processor machine during the course of generating the musical tone; and

changing the variable sampling frequency according to the detected load to adjust a rate of computation of the samples.

50. A machine readable media according to claim 49, wherein the step of changing provides a fast sampling frequency when the detected load is relatively light, and provides a slow sampling frequency when the detected load is relatively heavy.

51. A machine readable media for use in a processor machine including a CPU, said media containing program instructions executable by said CPU for causing the processor machine having a software module used to compute samples of a waveform for performing operation of generating a musical tone, wherein the operation comprises the steps of:

variably providing a trigger signal at a relatively slow rate to define a frame period between successive trigger signals;

periodically providing a sampling signal at a relatively fast rate such that a plurality of sampling signals occur within one frame period;

operating the processor machine resettable in response to each trigger signal and operable based on each sampling signal to periodically execute the software module for successively computing a number of samples of the waveform within one frame period;

detecting a load of computation imposed on the processor machine during the course of generating the musical tone;

varying the frame period according to the detected load to adjust the number of the samples computed within one frame period, and

converting each of the samples into a corresponding analog signal in response to each sampling signal to thereby generate the musical tones.

52. A machine readable media for use in a processor machine including a CPU, said media containing program instructions executable by said CPU for causing the processor machine having a software module used to compute samples of a waveform for performing operation of generating a musical tone, wherein the operation comprises the steps of:

periodically providing a trigger signal at a relatively slow rate to define a frame period between successive trigger signals;

periodically providing a sampling signal at a relatively fast rate such that a plurality of sampling signals occur within one frame period;

operating the processor machine resettable in response to a trigger signal and operable based on each sampling signal to periodically execute the software module for successively computing a number of samples of the waveform within one frame; and

converting each of the samples into a corresponding analog signal in response to each sampling signal to thereby generate the musical tones, wherein

the step of operating includes delaying step using a pair of memory regions for imparting a delay to the waveform to determine a pitch of the musical tone according to the performance information, the delay step successively writing the samples of the waveform of one musical tone into addresses of one of the memory regions and successively reading the samples from addresses of the same memory region to thereby create the delay, the delay step responding when the processor machine is reset so that said one musical tone is switched to another musical tone for successively writing the samples of the waveform of said another musical tone into addresses of the other memory region and successively reading the samples from addresses of the same memory region to thereby create the delay while clearing the one memory region to prepare for a further musical tone.

* * * * *

53. (New) A system for synthesizing a musical tone according to control information, comprising:

a processor that executes a process of managing the system and a process of providing the control information at a variable period;

a sound source module that generates a waveform of the musical tone based on the control information successively provided from the processor at the variable period;

a detector that detects a load imposed on the processor when the processor executes the processes; and

a controller that controls the variable period at which the processor provides the control information, according to the detected load of the processor.

54. (New) The system according to claim 53, wherein the processor manages the system and provides the control information by executing a program.

55. (New) The system according to claim 53, wherein the controller expands the variable period as the detected load of the processor increases.

56. (New) A system for synthesizing a musical tone according to control information, comprising:

a processor that executes a process of managing the system and a process of providing the control information at a variable frequency;

a sound source module that generates a waveform of the musical tone based on the control information successively provided from the processor at the variable frequency;

a detector that detects a load imposed on the processor when the processor executes the process; and

a controller that controls the variable frequency by which the processor successively provides the control information, according to the detected load of the processor.

57. (New) The system according to claim 56, wherein the processor manages the system and provides the control information by executing a program.

58. (New) The system according to claim 56, wherein the controller lowers the variable frequency as the detected load of the processor increases.

59. (New) A system for synthesizing a musical tone according to control information, comprising:

a processor that executes a process of successively providing the control information at a variable period, and another process of generating the musical tone based on the successively provided control information;

a detector that detects a load imposed on the processor when the processor executes the processes; and

a controller that controls the variable period at which the processor provides the control information, according to the detected load of the processor.

60. (New) The system according to claim 59, wherein the processor executes the processes according to a program.

61. (New) The system according to claim 59, wherein the controller expands the variable period as the detected load of the processor increases.

62. (New) A system for synthesizing a musical tone according to control information, comprising:

a processor that executes a process of successively providing the control information at a variable frequency, and another process of generating the musical tone based on the successively provided control information;

a detector that detects a load imposed on the processor when the processor executes the processes; and

a controller that controls the variable frequency by which the processor provides the control information, according to the detected load of the processor.

63. (New) The system according to claim 62, wherein the processor executes the processes according to a program.

64. (New) The system according to claim 62, wherein the controller lowers the variable frequency as the detected load of the processor increases.

65. (New) A method of synthesizing a musical tone according to control information by a processor and a sound source module, comprising the steps of:

operating the processor to execute a process of managing the system and a process of providing the control information at a variable period;

operating the sound source module to generate a waveform of the musical tone based on the control information successively provided from the processor at the variable period;

detecting a load imposed on the processor when the processor executes the processes; and

controlling the variable period at which the processor provides the control information, according to the detected load of the processor.

66. (New) A method of synthesizing a musical tone according to control information by a processor and a sound source module, comprising the steps of:

operating the processor to execute a process of managing the system and a process of providing the control information at a variable frequency;

operating the sound source module to generate a waveform of the musical tone based on the control information successively provided from the processor at the variable frequency;

detecting a load imposed on the processor when the processor executes the processes; and

controlling the variable frequency by which the processor successively provides the control information, according to the detected load of the processor.

67. (New) A method of synthesizing a musical tone by a processor according to control information, comprising:

operating the processor to execute a process of successively providing the control information at a variable period, and another process of generating the musical tone based on the successively provided control information;

detecting a load imposed on the processor when the processor executes the processes; and

controlling the variable period at which the processor provides the control information, according to the detected load of the processor.

68. (New) A method of synthesizing a musical tone by a processor according to control information, comprising:

operating the processor to execute a process of successively providing the control information at a variable frequency, and another process of generating the musical tone based on the successively provided control information;

detecting a load imposed on the processor when the processor executes the processes; and

controlling the variable frequency by which the processor provides the control information, according to the detected load of the processor.

69. (New) A medium for use in a system having a processor and a sound source module for synthesizing a musical tone according to control information, the medium containing a program executable by the processor for causing the system to perform a method comprising the steps of:

processing a load for managing the system and for providing the control information at a variable period;

operating the sound source module to generate a waveform of the musical tone based on the control information successively provided at the variable period;

detecting the load imposed on the processor when the processor executes the program; and

controlling the variable period at which the control information is successively provided, according to the detected load of the processor.

70. (New) A medium for use in a system having a processor and a sound source module for synthesizing a musical tone according to control information, the medium containing a program executable by the processor for causing the system to perform a method comprising the steps of:

processing a load for managing the system and for providing the control information at a variable frequency;

operating the sound source module to generate a waveform of the musical tone based on the control information successively provided at the variable frequency;

detecting the load imposed on the processor when the processor executes the program; and

controlling the variable frequency by which the control information is successively provided, according to the detected load of the processor.

71. (New) A medium for use in a system having a processor for synthesizing a musical tone according to control information, the medium containing a program executable by the processor for causing the system to perform a method comprising the steps of:

successively providing the control information at a variable period;

generating the musical tone based on the successively provided control information;

detecting a load imposed on the processor when the processor executes the program; and

controlling the variable period at which the control information is provided, according to the detected load of the processor.

72. (New) A medium for use in a system having a processor for synthesizing a musical tone according to control information, the medium containing a program executable by the processor for causing the system to perform a method comprising the steps of:

successively providing the control information at a variable frequency;

generating the musical tone based on the successively provided control information;

detecting a load imposed on the processor when the processor executes the program; and

controlling the variable frequency at which the control information is provided, according to the detected load of the processor.